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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/525,225	02/22/2005	Tatsuya Ohmi	101175-00061	7196

4372 7590 06/18/2007

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EXAMINER	
KESSLER, CHRISTOPHER S	
ART UNIT	**PAPER NUMBER**
1742	

MAIL DATE	DELIVERY MODE
06/18/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/525,225	OHMI ET AL.	
	Examiner	Art Unit	
	Christopher Kessler	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-8 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-8 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 recites the limitation "the first metal" in line 4. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by U.S. patent 2,695,230 issued to Haller (hereinafter "Haller").

Haller teaches a method for producing a metal formed article comprising the steps of burying a formed article comprising a metal in a powder of another metal, and forming a powder formed article (see cols. 1-2, or claim 1). Haller teaches that the step comprises heating such that the buried article substantially melts and infiltrates the first metal (see cols. 1-2, or claim 1). Haller teaches wherein a space is formed in the region where the second metal was, and wherein the powder is sintered and solidified (see cols. 1-2, Figures 1-7, or claim 1).

6. Claims 1, 5 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. patent 3,706,550 issued to Umehara, et al. (hereinafter "Umehara").

Umehara teaches a method for producing a metal formed article comprising the steps of burying a formed article comprising a metal in a powder of another metal, and forming a powder formed article (see cols. 3-6, claim 1). Umehara teaches that the step comprises heating such that the buried article melts and infiltrates the first metal (see cols. 3-6, Figs. 7-8, claim 1). Umehara teaches wherein a space is formed in the region where the second metal was, and wherein the powder is sintered and solidified (see cols. 3-6).

Umehara further teaches wherein the first metal is copper and the second metal is an alloy of tin (see claims 1 and 4).

Umehara does not explicitly teach wherein the first metal and second metal form an alloy. Umehara teaches that the infiltrant provides strengthening and reinforcing of the matrix (see col. 7). Thus, the formation of a new alloy coating is inherent in the process of Umehara. Applicant is further directed to MPEP §2112.01.

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1, 2, 3 and 6 are rejected under 35 U.S.C. 102(e) as being anticipated by WO 02/078881 A1 issued to Park (hereinafter "Park").

Park teaches a method for producing a metal formed article comprising the steps of burying a formed article comprising a metal in a powder of another metal, and forming a powder formed article (see pp. 3-9). Park teaches that the step comprises heating such that the buried article melts and infiltrates the first metal (see pp. 3-9). Park teaches wherein a space is formed in the region where the second metal was, and wherein the powder is sintered and solidified (see pp. 3-9).

Park further teaches wherein the first metal may be iron and the second metal may be aluminum (see p. 4).

Park further teaches wherein the first metal and second metal form an alloy (see pp. 3-9). Park further teaches that the infiltrated metal seals the part (see pp. 3-9), meeting the limitation of forming a coating.

Park does not teach wherein an intermetallic coating is formed. However, Park teaches that when the first metal is iron, and the second metal is copper, an alloy is formed (see pp. 3-9). Park teaches that aluminum can be used as the second metal (see pp. 3-9). Thus, the formation of a coating composed of an intertmetallic would be inherent in the process of using iron as the first metal and aluminum as the second metal. Applicant is further directed to MPEP §2112.01.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haller in view of U.S. Patent Publication US 2004/0009086 issued to Sachs, et al. (hereinafter "Sachs"). Haller is applied to the claim as stated above. Haller does not teach wherein the second metal is Si. Haller teaches that other metals may be used in the invention (see cols. 3-4).

Sachs teaches a method of infiltrating a nickel alloy with a reduced melting point into a body of sintered nickel (see Abstract). Sachs teaches that this method avoids disadvantages in lower melting point infiltrants such as certification issues and corrosion issues (see paras. [0001]-[0005]). Sachs further teaches that silicon is added to the nickel to achieve the lower melting point (see claim 5, paras. [0006]-[0008]).

It would have been obvious to one of ordinary skill in the art at time of invention to alter the method of Haller by using nickel as the first metal and a silicon alloy as the second metal, as taught by Sachs (cited above), in order to create a part free from issues related to a lower melting point infiltrant material, as taught by Sachs (cited above).

11. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haller in view of U.S. Patent 4,971,755 issued to Kawano, et al. (hereinafter "Kawano").

Haller is applied to the claim as stated above. Haller does not teach wherein the first metal is Al and the second metal is Zn. Haller teaches that other metals may be used in the invention (see cols. 3-4).

Kawano teaches a method of preparing large size iron parts by powder metallurgy including vibratory charging and inclusion of aluminum powder to minimize shrinkage (see cols. 7-9). Kawano further teaches that an infiltrating metal is applied, which may be zinc (see cols. 10-11, claim 17). Kawano teaches that the surface roughness of parts produced in this way is improved (see cols. 1-2).

It would have been obvious to one of ordinary skill in the art at time of invention to alter the method of Haller by including aluminum powder in the first metal and zinc as the infiltrating metal, as taught by Kawano (cited above), in order to improve the surface roughness, as taught by Kawano (cited above).

12. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haller or Umehara or Park, in view of Rajiv Tandon and John Johnson, "Liquid Phase Sintering," ASM Handbook, vol. 7, pp. 565-573 (hereinafter "ASM Handbook").

Haller, Umehara, or Park is applied to the claim as stated above. Haller, Umehara or Park does not teach wherein the powder formed article is heated to at least a melting point of the second metal at a temperature rising rate of 1 kelvin/second or more.

ASM Handbook teaches methods employed by those of ordinary skill in the art (see p. 565). ASM Handbook teaches that liquid phase sintering can result in higher

densification rates and lower sintering temperatures (see p. 565). ASM Handbook further teaches that the process of transient liquid phase sintering is highly sensitive to processing conditions such as heating rate (see p. 571). It would have been obvious to one of ordinary skill in the art at time of invention to have employed the method of Haller Umehara or Park as stated above, and to optimize the heating rate, because ASM Handbook teaches that transient liquid phase sintering is "highly sensitive" to heating rate (see p. 571).

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. 4,834,938 teaches the process as claimed in claim 1. 3,852,045 teaches the process as claimed in claim 1. 4,810,289 teaches a method of HIPing a green compact surrounded by a higher-melting point powder to form electrical contacts, without any melting. JP06-158113 teaches to make a cavity inside a PM workpiece by using an organic core and burning out. 5,772,748 teaches using a copper or zinc preform to create a cavity or undercut in a PM part. 2,751,293 teaches a variation of Haller's process.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Kessler whose telephone number is (571) 272-6510. The examiner can normally be reached on Mon-Fri, 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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